

Pneumatic Cylinder Actuators

Series B1J

Installation, Maintenance and
Operating Instructions

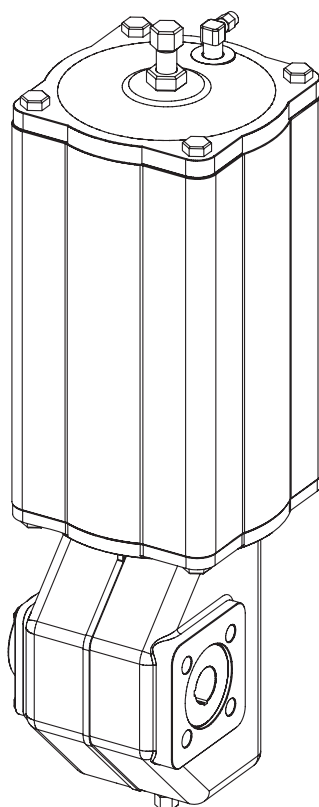


Table of Contents

1	GENERAL	3
1.1	Scope of the manual	3
1.2	Structure and operation	3
1.3	Actuator markings	3
1.4	Specifications	3
1.5	Recycling and disposal	4
1.6	Safety precautions	4
2	TRANSPORTATION, RECEPTION AND STORAGE.....	5
3	MOUNTING AND DEMOUNTING	5
3.1	Actuator gas supply	5
3.2	Mounting the actuator on the valve.....	5
3.3	Operating directions	6
4	MAINTENANCE	6
4.1	General	6
4.2	Maintenance of the B1J actuator	7
4.3	Maintenance of the B1JA actuator.....	9
4.4	Changing the B1J actuator into a B1JA actuator	11
4.5	B1JR and B1JAR actuators	11
4.6	B1JRR and B1JARR actuators.....	12
4.7	B1JV and B1JK actuators	14
4.8	B1JVA and B1JKA actuators	14
4.9	B1J 322 and B1JA 322 actuators	14
4.10	B1JH_ actuators.....	14
5	MALFUNCTIONS.....	15
6	TOOLS	15
7	ORDERING SPARE PARTS	15
8	EXPLODED VIEWS AND PARTS LISTS	16
8.1	Actuators B1J 8-20	16
8.2	Actuators B1J 25-32	17
8.3	Actuator B1JU322.....	18
8.4	Actuators B1JA 8-20	19
8.5	Actuator B1JA 25-32.....	20
8.6	Actuator B1JAU 322	21
9	DIMENSIONS AND WEIGHTS	22
9.1	Actuators B1J, B1JA	22
9.2	Actuator B1JR / B1JRR.....	22
9.3	Actuator B1JAR / B1JARR	23
9.4	Attachment dimensions	23
10	TYPE CODE.....	24

READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the actuator.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

Addresses and phone numbers are printed on the back cover.

SAVE THESE INSTRUCTIONS!

Subject to change without notice.

All trademarks are property of their respective owners.

1 GENERAL

1.1 Scope of the manual

These instructions provide essential information for the use of Metso B1J series actuators. For more details about valves, positioners and accessories, refer to the separate installation, operating and maintenance instructions of the particular unit.

1.2 Structure and operation

The B1J series actuators are pneumatic cylinder actuators designed for control and shut-off service. The linkage has PTFE, PE-HD and Glacier DU bearings. The robust cast-iron housing efficiently protects the mechanism from ambient dust and moisture.

The spring provides the required safety function; the valve either opens or closes if the air supply is interrupted.

The mounting face dimensions of the B1J actuator comply with the ISO 5211 standard.

In the B1J type, the spring is located on the piston rod side. The secondary shaft of the actuator, operated by the spring, rotates clockwise as seen from the pointer cover side. The piston then moves towards the end of the cylinder. The B1J type is normally applied for the spring-to-close operation, as it normally closes in the clockwise direction. The two keyways in the secondary shaft are positioned at an angle of 90° to each other, making it possible to change the position of the actuator in relation to the valve, see Fig. 1.

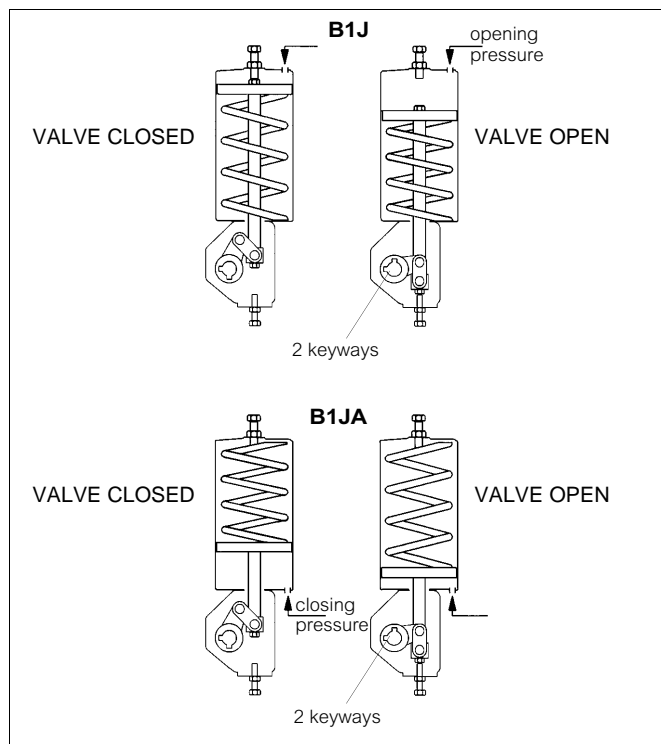


Fig. 1 Operating principle of the actuator

In the B1JA type, the spring is located in the cylinder end side. The secondary shaft, operated by the spring, rotates counter-clockwise as seen from the pointer cover side. The piston moves away from the cylinder

end. The B1JA type is used for the spring-to open function, see Fig. 1.

The size of the spring actuator is selected according to the torque given by the spring. It is, however, important to check that there is sufficient supply pressure to give the required torque in the opposite direction.

Screws are located in the upper end of the cylinder and in the lower end of the housing to regulate the length of the piston stroke and also the rotation angle of the actuator shaft.

1.3 Actuator markings

The actuator is provided with an identification plate, see Fig. 2. Identification plate markings are:

1. Type
2. Manufacturing site, date, successive no. (bar code)
3. SO number or ID number (bar code)
4. Checked by
5. Max. supply pressure

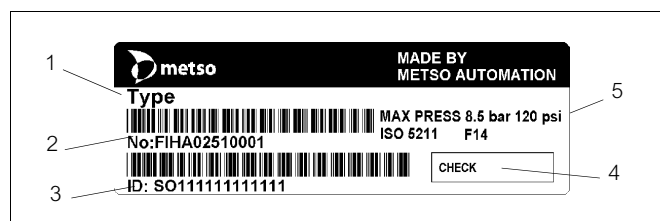


Fig. 2 ID plate

1.4 Specifications

Ambient temperature:

Standard design	-20° to 70 °C / -4° to 160 °F
Low temperature design	-40° to 70 °C / -40° to 160 °F
High temperature design	-20° to +120 °C / -4° to 250 °F

Maximum supply pressure: 8.5 bar / 120 psi

Stroke volume, dm³ / in³:

B1J/B1JA 8	0.9 / 55
B1J/B1JA 10	1.8 / 111
B1J/B1JA 12	3.6 / 225
B1J/B1JA 16	6.7 / 415
B1J/B1JA 20	13 / 795
B1J/B1JA 25	27 / 1642
B1J/B1JA 32	53 / 3231
B1J/B1JA 322	106 / 6480

Nominal torque at spring force, Nm / lbf ft:

B1J/B1JA 8	70 / 50
B1J/B1JA 10	150 / 110
B1J/B1JA 12	300 / 220
B1J/B1JA 16	600 / 440
B1J/B1JA 20	1200 / 880
B1J/B1JA 25	2400 / 1760
B1J/B1JA 32	4800 / 3500
B1J/B1JA 322	9600 / 7000

NB. The torque changes according to supply pressure.

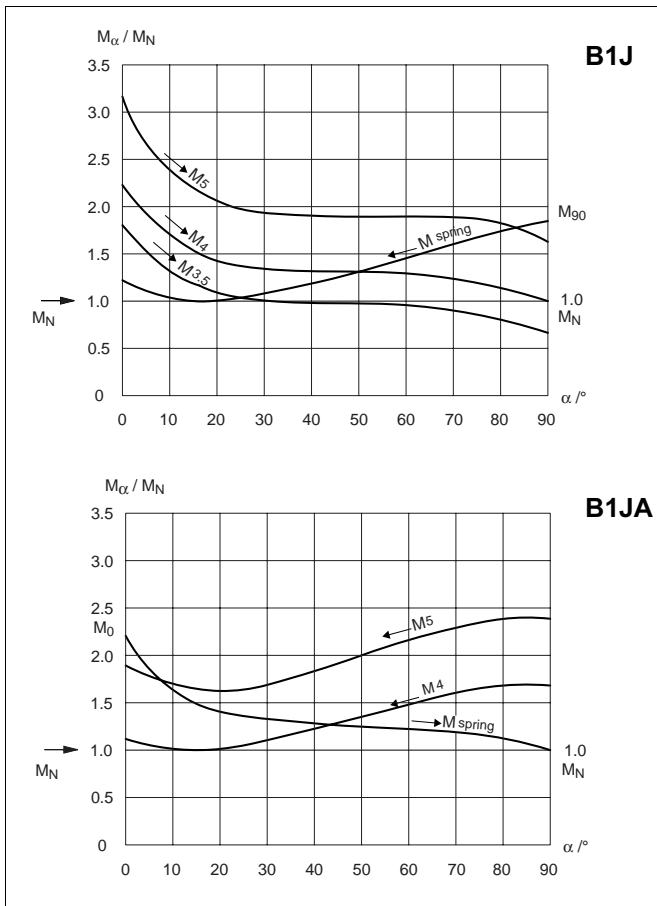


Fig. 3 Output torque as a function of turning angle

1.5 Recycling and disposal

Most actuator parts can be recycled if sorted according to material. Most parts have material marking. A material list is supplied with the actuator. In addition, separate recycling and disposal instructions are available from the manufacturer. An actuator can also be returned to the manufacturer for recycling and disposal against a fee.

1.6 Safety precautions

CAUTION:

Don't exceed the permitted values!

Exceeding the permitted pressure value marked on the actuator may cause damage and lead to uncontrolled pressure release in the worst case. Damage to the equipment and personal injury may result.

CAUTION:

Don't dismantle a pressurized actuator!

Dismantling a pressurized actuator leads to uncontrolled pressure release. Shut off the supply pressure and release pressure from the cylinder before dismantling the actuator. Otherwise, personal injury and damage to equipment may result.

CAUTION:

Follow the instructions given on the actuator warning plates!

CAUTION:

Before opening the cylinder fastening screws, release spring tension directed on actuator warning plate and in these instructions!

CAUTION:

Don't operate the actuator manually by turning from the lever arm!

CAUTION:

Don't dismantle the spring package!

The spring package within the cylinder is preloaded. The lock-welded fastening screw of the piston must never be opened or the spring package dismantled. The piston, piston rod, spring and spring plate of the B1J actuator are always delivered as a pre-assembled package.

CAUTION:

Don't use the lever in the torsion arm for manual operation when the actuator is pressurized!

Shut off the supply pressure and release pressure from the cylinder before using the hand lever. Note also the dynamic torque caused by the pipe flow. Otherwise, personal injury and damage to equipment may result.

CAUTION:

Take the weight of the actuator or valve combination into account when handling it!

Do not lift the valve combination from the actuator, positioner, limit switch or their piping. Lift the actuator as directed in Section 2, lifting ropes for a valve combination should be fastened around it. The weights are shown in Section 9. Dropping may result in personal injury or damage to the equipment.

2 TRANSPORTATION, RECEPTION AND STORAGE

Make sure that the actuator and associated equipment have not been damaged during transportation. Store the actuator carefully before installation, preferably indoors in a dry place. Do not take it to the installation site or remove the protective caps of ports for piping until just before installation.

Lift the actuator as shown in Fig. 4: in a horizontal position from the stop screws, in a vertical position from an eye bolt screwed in the place of a stop screw. Do not use the lug for lifting dual-cylinder actuators. Refer to Section 9 for weights.

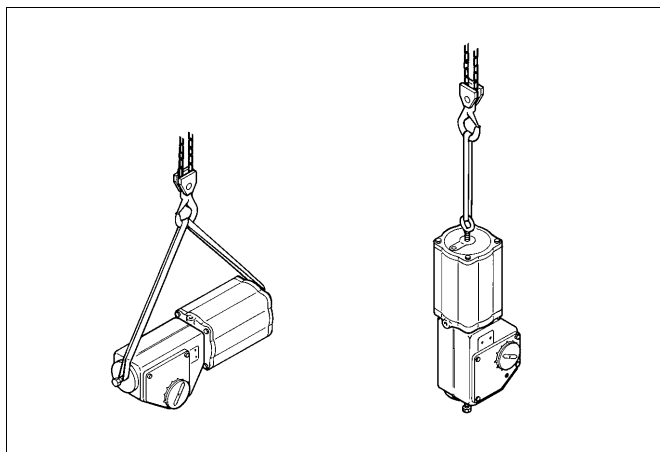


Fig. 4 Lifting the actuator

3 MOUNTING AND DEMOUNTING

3.1 Actuator gas supply

Dry compressed air or natural gas can be used in actuators in open-close operation, no oil spraying is needed. Clean, dry and oil-free instrument air must be used for cylinder actuators with a positioner. The air supply connections are presented in the dimensional drawings in Section 9. The maximum supply pressure is 8.5 bar.

3.2 Mounting the actuator on the valve

CAUTION:

Take the weight of the actuator or valve combination into account when handling it!

CAUTION:

Beware of the cutting movement of the valve!

Install the actuator so that the shaft of the valve or any other device to be actuated goes into the shaft bore of the actuator. If the bore is larger than the shaft diameter, use a collar in between. The actuator shaft bore has two keyways at an angle of 90°. These allow the installation position of the actuator to be changed in relation to the valve. Metso valves have a bevel at the end of their shafts to facilitate installation.

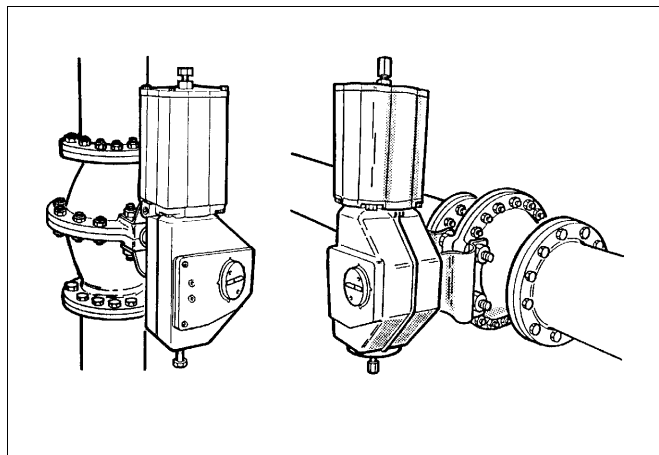


Fig. 5 Ways to install the actuator

The installation position can be selected freely, but Metso recommends installation with the cylinder upright. The actuator is thus best protected against damage due to supply air impurities or water.

When the installation position of the actuator is altered, the arrow indicating the operating direction must be turned to correspond with the actual operation of the valve.

When necessary, lubricate the actuator bore and collar with Cortec VCI 369 or an equivalent anti-corrosive agent to prevent it from jamming due to rust.

The actuator must not be allowed to come in contact with the pipework, because the vibrations may damage it or cause unsatisfactory operation.

In some cases, e.g. when using large actuators or with extensive pipework vibrations, the actuator should be supported. Consult Metso's Automation business for instructions.

If the actuator is used with devices other than Metso valves, any additional parts attached to the actuator must be properly protected.

3.3 Operating directions

A sticker on the actuator cylinder indicates the spring action direction.

NOTE:

Separate instructions are available for adjusting the close limit of metal-seated butterfly valves. Refer to the installation, operating and maintenance instructions of the valve.

3.3.1 B1J actuator - spring-to-close direction

Install the actuator on the valve with the piston in the upper end of the cylinder and the valve in the closed position, see Fig. 6. The cylinder must be depressurized and the air ports open. Adjust the closed-position setting using the stop screw (26) at the end of the cylinder. Seal the screw thread with a non-hardening sealant, such as Loctite 225 or the equivalent. The open-position setting is adjusted with the stop screw (27) at the bottom of the housing while the actuator is pressurized and the piston is in the lower position.

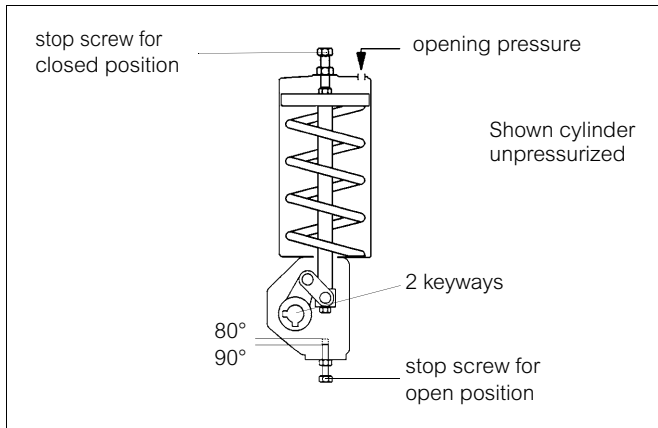


Fig. 6 B1J actuator

3.3.2 B1JA actuator - spring-to-open direction

Install the actuator on the valve with the piston in the lower end of the cylinder and the valve in the open position, see Fig. 7. The cylinder must be unpressurized and the air ports open. Adjust the open-position setting using the stop screw (27) at the end of the cylinder. The close-position setting is adjusted with the stop screw (26) at the end of the cylinder while the actuator is pressurized and the piston is in the upper position.

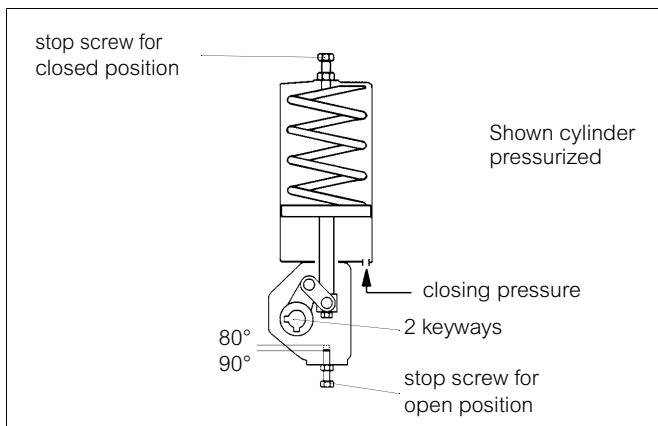


Fig. 7 B1JA actuator

3.3.3 Demounting the actuator from the valve

CAUTION:

Take the weight of the actuator or valve combination into account when handling it!

CAUTION:

Beware of the cutting movement of the valve!

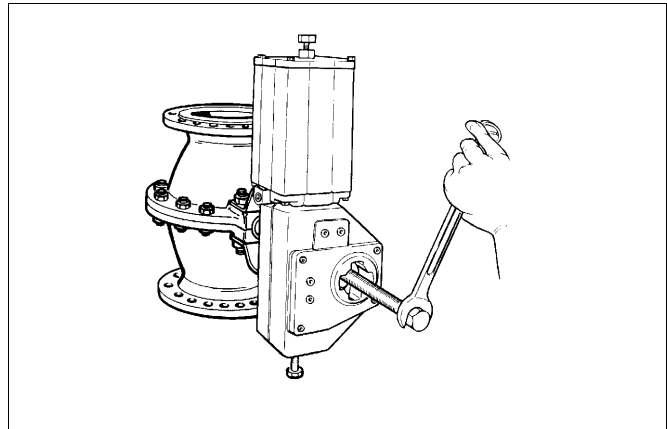


Fig. 8 Removing the actuator with the extractor

The actuator must be depressurized and the supply air pipes disconnected. Unscrew the actuator-side screws of the bracket and pull the actuator off the valve shaft. This is best done using a specific extractor, see Fig. 8 and Section 6. Note the mutual positioning of the valve and the actuator to ensure correct functioning after reassembly.

4 MAINTENANCE

4.1 General

CAUTION:

Note the precautions in Section 1.6 before beginning work!

Under normal conditions, the actuators do not need regular maintenance. Maintenance procedures that the end user can do himself when necessary are described below.

Unless stated otherwise, the part numbers given refer to the exploded view and parts list in Section 8.

In especially harsh corrosive conditions the linkage system inside the housing must be lubricated every six months. Use Cortec VCI 369 anti-corrosive agent or the equivalent. The housing may also be half filled with semi-fluid water-resistant grease (e.g. Mobilux EP2) while the piston rod is in the lower position.

If you remove the stop screw, adjust the limits after lubrication or grease filling!

4.2 Maintenance of the B1J actuator

CAUTION:

Don't dismantle a pressurized actuator!

CAUTION:

To release spring tension, the stop screw at the end of the cylinder must be removed before the cylinder fastening screws are opened!

CAUTION:

Don't dismantle the spring package!

The spring package within the cylinder is preloaded. Never open the lock-welded fastening screw of the piston or dismantle the spring package. The piston, piston rod, spring and spring plate of the B1J actuator are always delivered as a pre-assembled package.

The cylinder has a warning plate (43). When servicing the unit, check that the plate is in place and legible. See Fig. 9. Also check that the cylinder has the arrow sticker indicating the spring operating direction.



Fig. 9 Warning plate of the B1J actuator

4.2.1 Replacement of piston seals

We recommend that all seals and soft bearings be replaced when the actuator has been dismantled for servicing.

- ☐ Detach the actuator.
- ☐ Check that the cylinder has been depressurized, and the piston is at the outermost end of the cylinder.
- ☐ Remove the cylinder end side stop screw (26).
- ☐ Remove cylinder end (44).
- ☐ Remove housing cover (2).
- ☐ Unscrew the bearing screw (29) and the cylinder fastening screws (31) from the cylinder base (6) side, see Fig. 10. If the piston turns, do not prevent the turning with the piston fastening nut; send the entire actuator to the manufacturer to be repaired. **It is very dangerous if the lock welding of the piston fastening nut is broken!**
- ☐ Remove the cylinder with the piston - do not dismantle the spring package!
- ☐ Remove the O-rings.
- ☐ Slide the piston out of the cylinder.
- ☐ Remove old seals and O-rings (24, 18).
- ☐ Remove piston rod seal (16) and bearing (22). Clean the seal space.

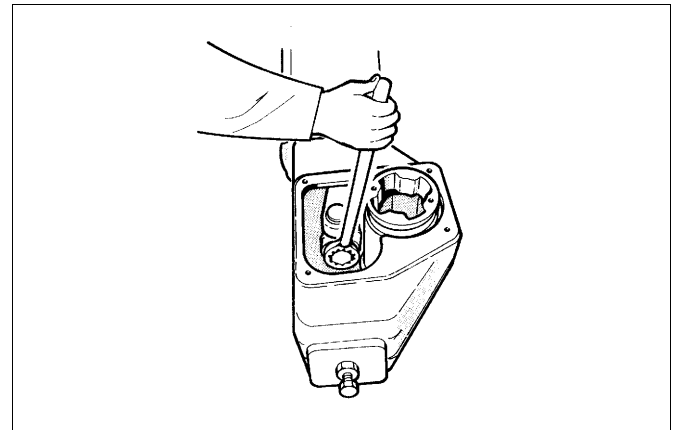


Fig. 10 Opening the fastening screw of the actuator bearing unit

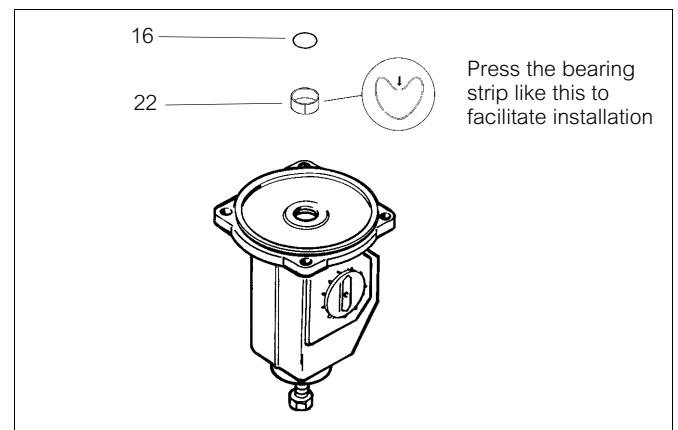


Fig. 11 Mounting the piston rod bearing and seal

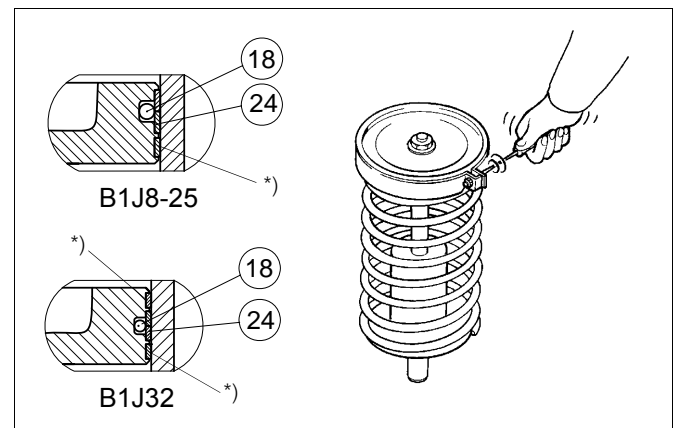


Fig. 12 Tightening piston seals with a tie ring

- ☐ Lubricate seal space and new O-ring with Unisilikon L250L or equal silicone grease. Install new bearing and O-ring, see Fig. 11.
- ☐ Clean piston seal groove and apply a thin coat of Cortec VCI 369.
- ☐ Install the O-ring (18) located under the piston seals.
- ☐ Place piston seals (24) around the piston so that the ends of the strips are located at opposite sides. Tighten the strips with a tie ring as in Fig. 12. Strips indicated with an asterisk can be cut 1.5 to 3 mm shorter to facilitate assembly.

NOTE:

The inside surface of the cylinder must be free of any grease!

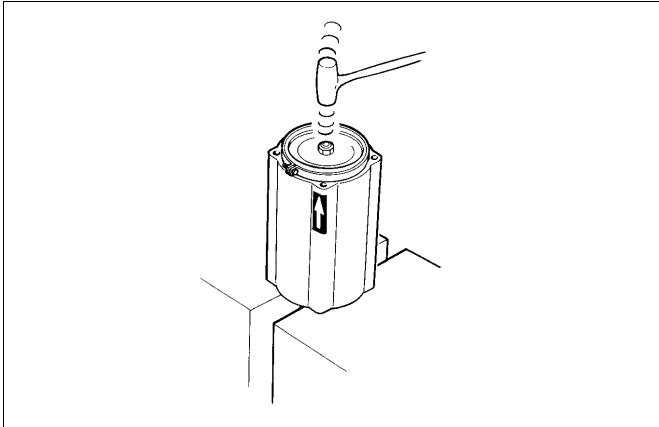


Fig. 13 Placing the piston in the cylinder

- ❑ Hammer or press the piston into the cylinder through the tie ring. Note the indicator arrow direction. See Fig. 13.
- ❑ Install new O-rings (19). **Sizes 8 and 10:** ensure that the protection bushing (12A) is in place. Replace cylinder end and install cylinder with piston. Note the location of the air supply port: it must correspond to the exhaust air port in the cylinder base. Tighten screws (31); the torque is given in Table 1.

Table 1 Tightening torques for screws

Torque, Nm				
Item	29	30	31	35
Actuator				
B1J 8	35	8	18	150
B1J 10	90	8	40	180
B1J 12	170	12	18	200
B1J 16	300	12	40	250
B1J 20	700	20	80	400
B1J 25	1100	30	80	800
B1J 32	2000	70	80	1500

- ❑ Apply bearing unit screw (29) thread with a sealant, e.g. Loctite 225, and tighten the screw as in Table 1.
- ❑ Fasten the housing cover temporarily so that the secondary shaft bearings function but the linkage can still be seen, see Fig. 14. Note the grounding rings (3A, 4A).

CAUTION:

Keep your fingers, tools or other items out of the housing while operating the actuator with the cover open!

- ❑ Check the attachment of the end and the base before temporarily connecting the compressed air supply to the actuator with a shut-off valve.
- ❑ Operate the actuator to check cylinder function and the condition of linkage bearings. Close the air supply and depressurize the cylinder.

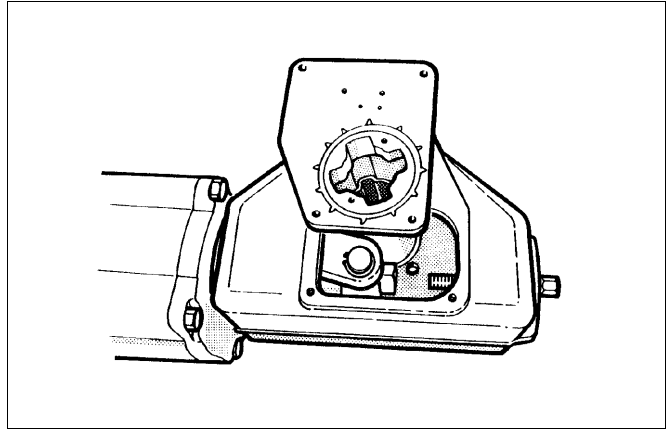


Fig. 14 Mounting the cover on the housing

- ❑ Lubricate the linkage throughout with Cortec VCI 369 anti-corrosive agent.
- ❑ Apply sealant, e.g. Loctite 573, to the interface between housing and cover and fasten the cover. See Table 1 for torque.
- ❑ Install the actuator on the valve and adjust the stop screws.

To remove the cylinder base, you will need a special tool for opening the lock nut, see Section 6.

4.2.2 Replacement of linkage bearings and O-rings

- ❑ Detach actuator from valve.
- ❑ Check that the cylinder has been depressurized, and the piston is at the outermost end.
- ❑ Remove cylinder end side stop screw (26).
- ❑ Remove housing cover (2).
- ❑ Open bearing unit (5) fastening screw (29). See Fig. 10.
- ❑ Turn lever arm (3) to detach the bearing unit from the piston rod (10). Lift the entire linkage out of the housing. See Fig. 15.
- ❑ Remove lock rings (36) and support rings (37). See Fig. 16.
- ❑ Remove connection arms (4), ring (4A) and check the condition of the bearings (20, 21).

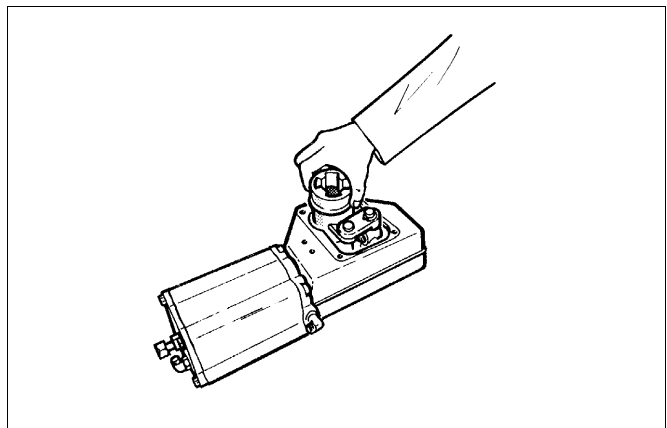


Fig. 15 Removing the linkage from the housing

The connection arm (4) bearings (20, 21) of the B1J8-25 actuator are fastened with a press-on fit, and therefore the entire connection arm must be replaced

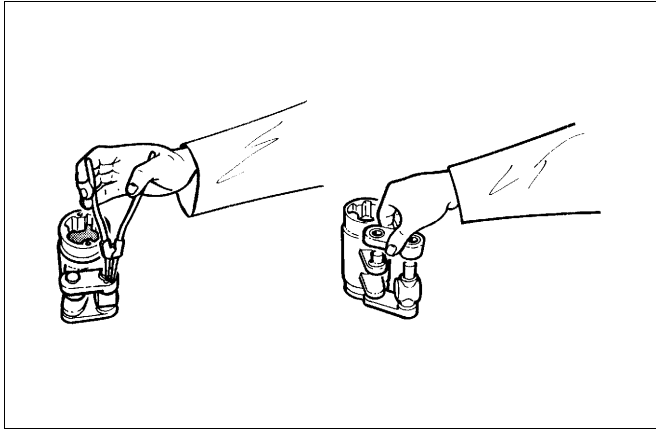


Fig. 16 Dismantling the linkage

instead of changing the bearings. In the B1J32 actuator, the bearings can be removed.

- ❑ Remove lever arm bearings (23), O-rings (17) and the grounding ring (3A).
- ❑ Clean the linkage parts and apply Cortec VCI 369 to bearing and seal surfaces.
- ❑ Install the grounding ring (3A), the lever bearings (23) and the O-rings (17). The grounding rings (3A and 4A) are needed to meet the ATEX requirements.
- ❑ Assemble the linkage and install in the housing. See Figure 16 for the correct position. Note the ring (4A).
- ❑ Apply sealant, e.g. Loctite 225, to the bearing unit screw (29) thread and tighten the screw as in Table 1.
- ❑ Lubricate the linkage throughout with Cortec VCI 369 anti-corrosive agent.
- ❑ Apply sealant, e.g. Loctite 573, to the interface between housing and cover and fasten the cover. See Table 1 for torque.
- ❑ Operate the actuator to check that it is moving properly.
- ❑ Install the actuator on the valve and adjust the stop screws.

In a corrosive environment with high ambient humidity the linkage must be lubricated with Cortec VCI 369 every six months or the housing filled with grease. See Section 4.1.

4.3 Maintenance of the B1JA actuator

CAUTION:

Don't dismantle a pressurized actuator!

CAUTION:

To release spring tension, always remove the stop screw at the bottom of the housing before opening the cylinder fastening screws !

The cylinder has a warning plate (43), see Fig. 17. When servicing the unit, check that the plate is in place and legible. Also check that the cylinder has the arrow sticker indicating the spring operating direction.

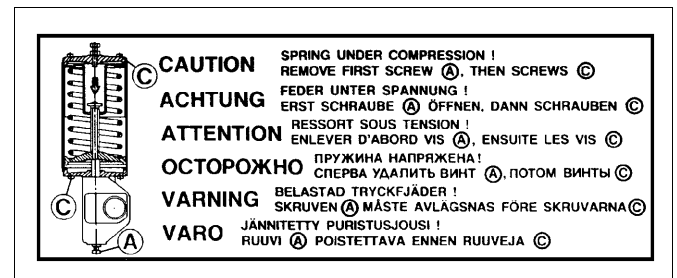


Fig. 17 B1JA actuator warning plate

CAUTION:

Don't dismantle the spring package!

The spring pack within the cylinder is preloaded. Never open the lock-welded fastening screw or the piston or dismantle the spring package. The piston, piston rod, spring and spring plate of the B1JA actuator are always delivered as a pre-assembled package.

4.3.1 Replacement of piston seals

We recommend that all seals and soft bearings be replaced when the actuator has been dismantled for servicing.

- ❑ Detach the actuator from the valve.
- ❑ Check that the cylinder has been depressurized, and the piston is at the cylinder base end.
- ❑ Remove the cylinder base side stop screw (27).
- ❑ Remove cylinder fastening screws (31) from the cylinder base (6) side. Lift the cylinder off together with the end.
- ❑ Remove housing cover (2).
- ❑ Turn the linkage enough to expose the bearing unit fastening screw (29). Open the screw.
- ❑ Remove the piston with the spring package - **do not dismantle the spring package!**
- ❑ Remove old seals and the O-ring (24, 18).
- ❑ Remove piston rod seal (16) and bearing (22). Clean the seal space.
- ❑ Lubricate seal space and new O-ring with Unisilikon L250L or Molykote III. Install new bearing and O-ring, see Fig. 11.
- ❑ Clean piston seal groove and apply a thin coat of Cortec VCI 369.
- ❑ Install the O-ring (18) located under the piston seals.

- ❑ Place piston seals (24) around the piston so that the ends of the strips are at opposite sides. Tighten the strips with a tie ring as in Fig. 18. Strips indicated with an asterisk can be cut 1.5 to 3 mm shorter to facilitate assembly.

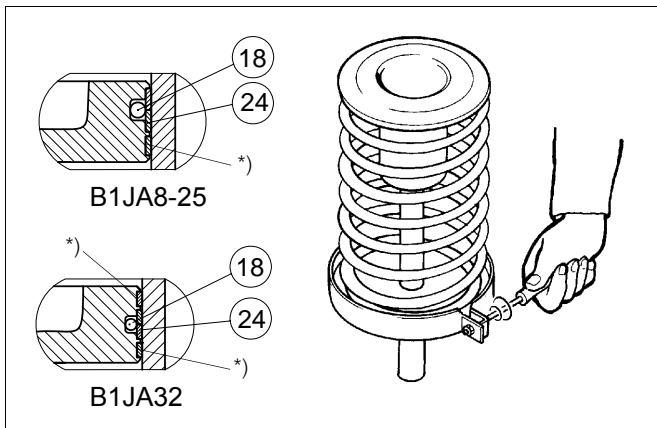


Fig. 18 Tightening piston seals with the tie ring

NOTE:

The inside surface of the cylinder must be free of any grease!

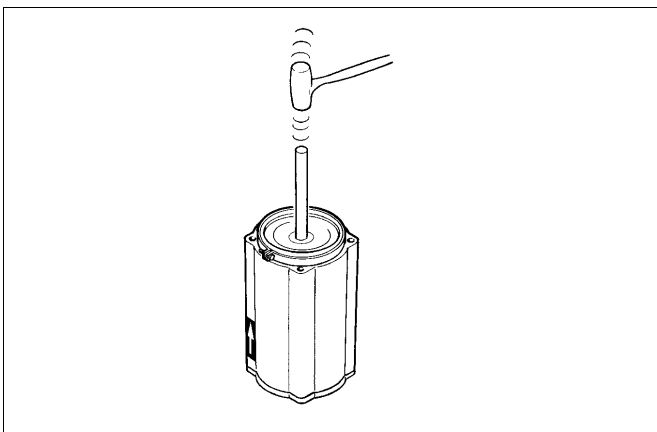


Fig. 19 Placing the piston in the cylinder

- ❑ Hammer or press the piston into the cylinder through the tie ring. Note the indicator arrow direction. See Fig. 19.
- ❑ Install new cylinder base O-rings (19). **Sizes 8 and 10:** ensure that the protection bushing (12A) is in place. Replace cylinder with piston.
- ❑ Apply sealant, e.g. Loctite 225, to the bearing unit screw (29) thread and tighten the screw as in Table 1 before mounting onto cylinder base.
- ❑ Fasten the housing cover temporarily so that the secondary shaft bearings function but the linkage can be seen.

CAUTION:

Keep your fingers, tools or other items out of the housing while operating the actuator with the cover open!

- ❑ Check the attachment of the end and the base before temporarily connecting the compressed air supply to the actuator with a shut-off valve.

- ❑ Operate the actuator to check cylinder function and the condition of bearings. Close the air supply and depressurize the cylinder.
- ❑ Lubricate the linkage throughout with Cortec VCI 369 anti-corrosive agent.
- ❑ Apply sealant, e.g. Loctite 573, to the interface between housing and cover and fasten the cover. See Table 1 for torque.
- ❑ To remove the cylinder base, you will need a special tool for opening the lock nut, see Section 6. When reinstalling, secure the nut with Loctite 225.
- ❑ Install the actuator on the valve and adjust the stop screws.

4.3.2 Replacement of linkage bearings and O-rings

CAUTION:

For reasons of safety, follow the work procedure given below exactly.

- ❑ Detach actuator from valve.
- ❑ Check that the cylinder has been depressurized, and the piston is at the cylinder base end.
- ❑ Remove housing end stop screw (27).
- ❑ Remove housing cover (2).
- ❑ Open cylinder fastening screws (31) from the base side.
- ❑ Lift cylinder and piston until the bearing unit fastening screw (29) can be opened.
- ❑ Open fastening screw. See Fig. 10.
- ❑ Turn lever arm (3) to detach the bearing unit (5) from the piston rod. Lift the entire linkage out of the housing. See Fig. 15.
- ❑ Remove lock rings (36) and support rings (37). See Fig. 16.
- ❑ Remove connection arms (4), ring (4A) and check the condition of the bearings (20, 21).

The connection arm (4) bearings (20, 21) of the B1J8-25 actuator are fastened with a press-on fit, and so the entire connection arm must be replaced instead of changing the bearings. In the B1J32 actuator, the bearings can be removed.

- ❑ Remove lever arm bearings (23) and O-rings (17) and the grounding ring (3A).
- ❑ Clean linkage parts and apply Cortec VCI 369 to bearing and seal surfaces.
- ❑ Install the grounding ring (3A), the lever bearings (23) and the O-rings (17). The grounding rings (3A and 4A) are needed to meet the ATEX requirements.
- ❑ Assemble the linkage and install in the housing. See Figure 16 for the correct position. Note the ring (4A).
- ❑ Apply sealant, e.g. Loctite 225, to bearing unit screw (29) thread and tighten the screw as in Table 1.
- ❑ Install new cylinder base O-ring (19). Install the cylinder.
- ❑ Apply Cortec VCI 369 anti-corrosive agent to the linkage throughout.

- ❑ Apply sealant, e.g. Loctite 573t, to the interface between housing and cover, and fasten the cover.
- ❑ Operate the actuator to check that it is moving properly.
- ❑ Install the actuator on the valve and adjust the stop screws.

In a corrosive environment with high ambient humidity the linkage must be lubricated with Cortec VCI 369 about every six months, or the housing filled with grease. See Section 4.1.

4.4 Changing the B1J actuator into a B1JA actuator

The B1J actuator can be changed into a B1JA actuator by replacing the spring package and turning the cylinder the other way around.

4.4.1 Removing the cylinder

Remove the cylinder as in Section 4.2.1.

4.4.2 Changing the spring package

Replace the spring package of the B1J actuator with a B1JA spring package ordered from the manufacturer. The cylinder must be turned 180°. See Fig. 20.

NOTE:

The warning plate of the cylinder must also be changed to correspond with the B1JA actuator!

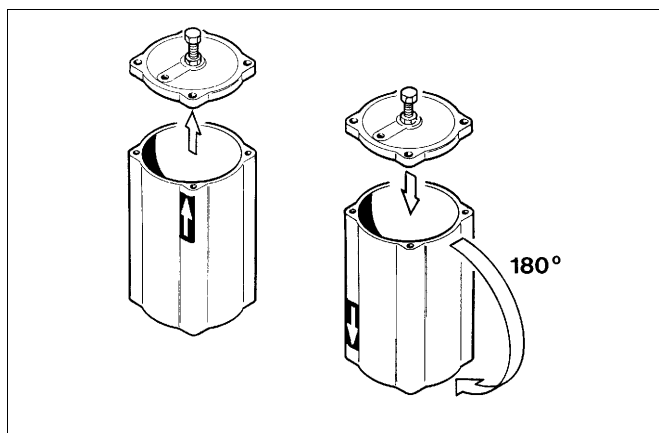


Fig. 20 Turning the cylinder

4.4.3 Assembling the actuator

Assemble the actuator as in Section 4.3.1.

4.5 B1JR and B1JAR actuators

4.5.1 B1JR actuator

The B1JR actuator is otherwise like the B1J except that it can be operated manually to bring the piston to the lower position against the spring in case there is no air supply. The B1J actuator can be changed into a B1JR by replacing the cylinder end (44) accordingly and adding parts (50 to 56), see Fig. 22

NOTE:

There is some air bleed through the spindle thread when the spindle (50) with the O-ring (54) is positioned inside the cylinder. I.e. when the valve has been manually operated to open position during compressed air loss and then the air pressure is restored. To stop the leakage operate the manual override to closed position. See Fig. 22

4.5.1.1 Maintenance

CAUTION:

To release spring tension, always turn the hand-wheel to anti-clockwise end position before opening the cylinder fastening screws!

The cylinder has a warning plate (43), see Fig. 21. When servicing the unit, check that the plate is in place and legible. Also check that the cylinder has the arrow sticker indicating the spring operating direction.

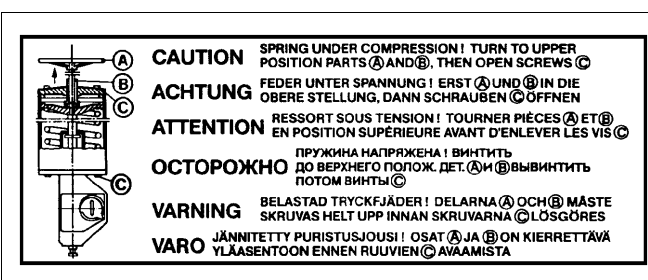


Fig. 21 B1JR actuator warning plate

If air escapes between the spindle (50) and spindle nut (51), check the O-ring (54) and replace it if necessary. Also check the condition of the cylindrical roller (56). See Fig. 22. Other maintenance as described for the B1J actuator in Section 4.2.

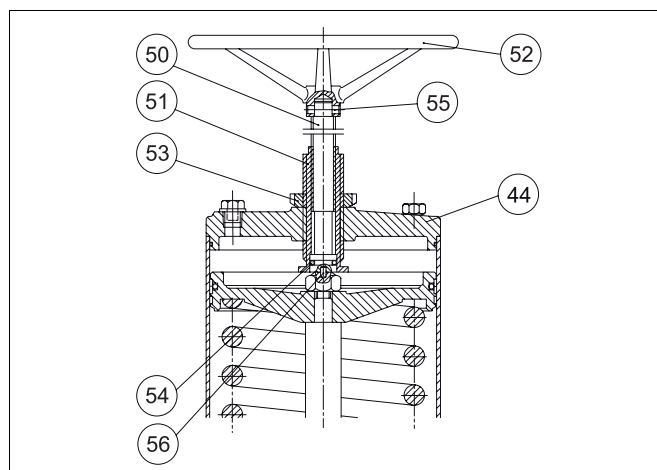


Fig. 22 B1JR actuator

Parts list for Fig. 22:

Part	Quantity	Name
44	1	Cylinder end
50	1	Spindle
51	1	Spindle nut
52	1	Hand wheel
53	1	Lock nut
54	1	O-ring
55	1	Spring pin
56	1	Cylindrical roller

4.5.1.2 Valve close and open position adjustment

In the B1JR actuator, unlike in the B1J, the upper valve position limit is adjusted with the spindle nut (51) secured with the lock nut (53). During adjusting, the spindle (50) must be in the extreme outer position.

4.5.2 B1JAR actuator

The B1JAR actuator is otherwise like the B1JA, except that it can be operated manually to bring the piston to the upper position against the spring in case there is no air supply. The B1JA actuator can be changed into a B1JAR by replacing the housing (1) and adding parts (50 to 56), see Fig. 24.

To make the change, the actuator must be dismantled, see Section 4.3.2. A special tool is needed to unscrew and fasten the lock nut (35) fastening the cylinder base to the housing. See Section 6.

4.5.2.1 Maintenance

CAUTION:
To release spring tension, always turn the hand-wheel to anti-clockwise end position before opening the cylinder fastening screws!

The cylinder has a warning plate (43). When servicing the unit, check that the plate is in place and legible, see Fig. 23. Also check that the cylinder has the arrow sticker indicating the spring operating direction.



Fig. 23 B1JAR actuator warning plate

If stiffness or noise occurs when the actuator is operated with the handwheel, check the condition of the bearings (56), see Fig. 24. Other maintenance as described for the B1JA actuator in Section 4.3.

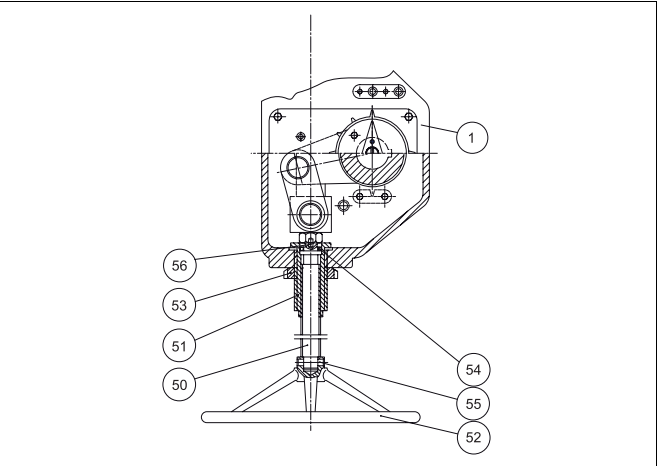


Fig. 24 B1JAR actuator

Parts list for Fig. 24:

Part	Quantity	Name
1	1	Housing
50	1	Spindle
51	1	Spindle nut
52	1	Hand wheel
53	1	Lock nut
54	1	O-ring
55	1	Spring pin
56	1	Cylindrical roller

4.5.2.2 Valve close and open position adjustment

In the B1JAR actuator, unlike in the B1JA, the lower valve position limit is adjusted with the spindle nut (51) secured with the lock nut (53). During adjusting, the spindle (50) must be in the extreme outer position.

4.6 B1JRR and B1JARR actuators

4.6.1 B1JRR actuator

The B1JRR actuator is otherwise like the B1J except that it can be operated manually to bring the piston to the lower position against the spring in case there is no air supply. Turning the handwheel clockwise closes the valve. The B1J actuator can be changed into a B1JRR by replacing the cylinder end (44) accordingly and adding parts (306 to 320), see Fig. 27.

NOTE:
There is some air bleed trough the spindle thread and the relief valve (58) when the sealing slide (15) with the O-rings (16) is positioned inside the cylinder. I.e. when the valve has been manually operated to open position during compressed air loss and then the air pressure is restored. To stop the leakage operate the manual override to closed position. See Fig. 25

The manual gear is disengaged when the handwheel is turned anti-clockwise to the extreme position:

- B1JRRU20, B1JARRU20: 240 turns / 90° operation
- B1JRRU25, B1JARRU25: 300 turns / 90° operation
- B1JRRU32, B1JARRU32: 377 turns / 90° operation

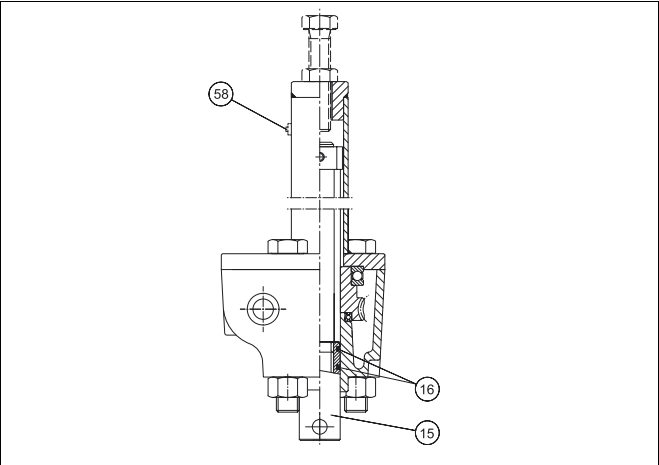


Fig. 25 Manual override

4.6.1.1 Maintenance

CAUTION:

To release spring tension, always remove the screw (319) and nut (320) and turn the handwheel to clockwise end position before opening the cylinder or gear fastening screws!

The cylinder has a warning plate (43), see Fig. 26. When servicing the unit, check that the plate is in place and legible. Also check that the cylinder has the arrow sticker indicating the spring operating direction.

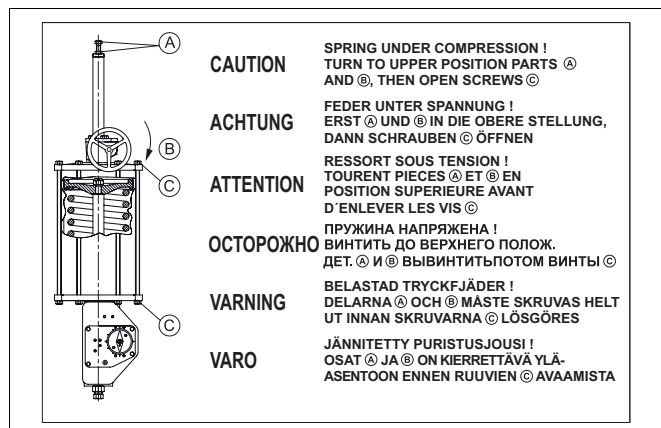


Fig. 26 B1JRR actuator warning plate

The manual override requires no regular maintenance. Grease can be added to the gear through the hole of the outermost fitting screw, if needed.

Other maintenance as described for the B1J actuator in Section 4.2.

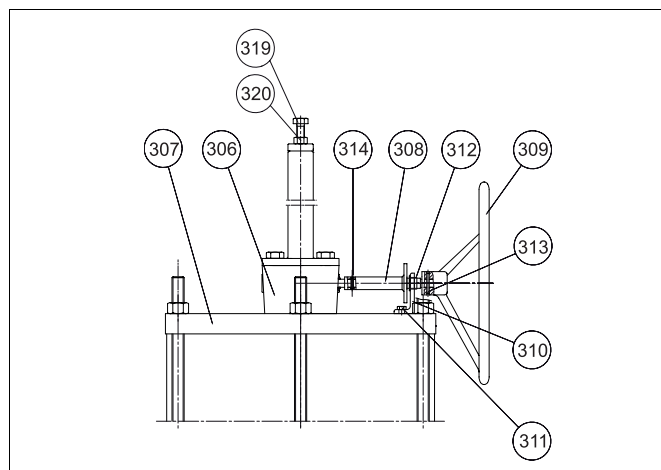


Fig. 27 B1JRR actuator

Parts list for Fig. 27:

Part	Quantity	Name
306	1	Manual overdrive
307	1	Cylinder end
308	1	Extension shaft
309	1	Handwheel
310	1	Support bracket
311	1	Hex screw
312	1	Bearing
313		Pin
314		Pin
319		Hex screw
320		Hex nut

4.6.1.2 Valve close and open position adjustment

In the B1JRR actuator the upper valve position limit is adjusted with the screw (319) and secured with the lock nut (320).

4.6.2 B1JARR actuator

The B1JARR actuator is otherwise like the B1JA, except that it can be operated manually to bring the piston to the upper position against the spring in case there is no air supply. Turning the handwheel clockwise closes the valve. The B1JA actuator can be changed into a B1JARR by replacing the housing (1) and adding parts (305 to 324), see Fig. 29.

To make the change, the actuator must be dismantled, see Section 4.3.2. A special tool is needed to unscrew and fasten the lock nut (35) fastening the cylinder base to the housing. See Section 6.

4.6.2.1 Maintenance

CAUTION:

To release spring tension, always remove the screw (323) and nut (324) and turn the handwheel to anti-clockwise end position before opening the cylinder or gear fastening screws!

The cylinder has a warning plate (43). When servicing the unit, check that the plate is in place and legible, see Fig. 28. Also check that the cylinder has the arrow sticker indicating the spring operating direction.

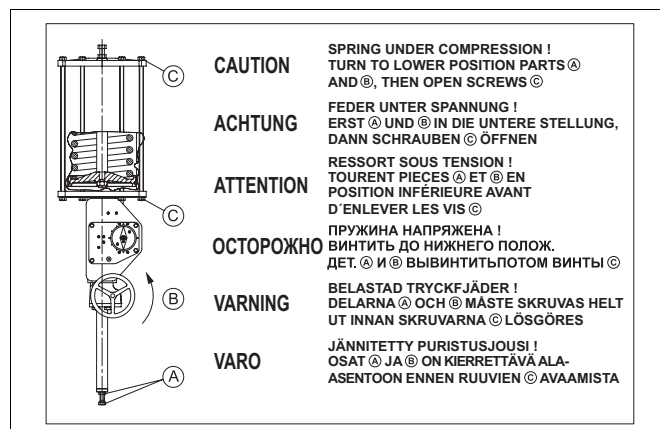


Fig. 28 B1JARR actuator warning plate

The manual override requires no regular maintenance. Grease can be added to the gear through the hole of the outermost fitting screw, if needed.

Other maintenance as described for the B1JA actuator in Section 4.3.

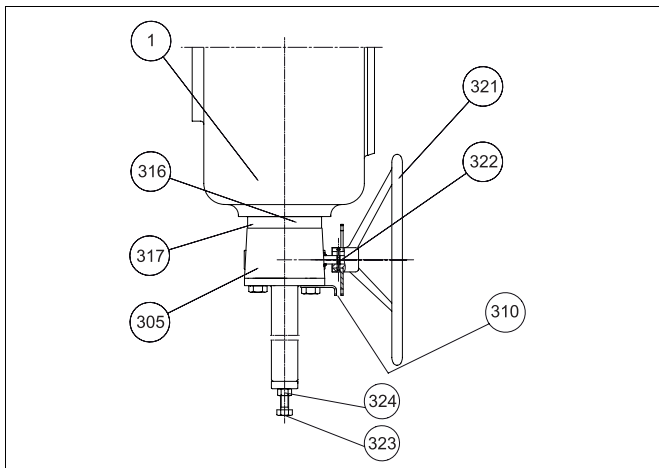


Fig. 29 B1JARR actuator

Parts list for Fig. 29:

Part	Quantity	Name
1	1	Housing
305	1	Manual overdrive
310	1	Support bracket
316	1	Fitting plate (size 20 only)
317	1	Socket screw (size 20 only)
321	1	Handwheel
322	1	Pin
323	1	Hex screw
324	1	Hex nut

4.6.2.2 Valve close and open position adjustment

In the B1JARR actuator, unlike in the B1JA, the lower valve position limit is adjusted with the screw (323) and secured with the lock nut (324).

4.7 B1JV and B1JK actuators

The actuators are otherwise like the B1J, except the B1JV has a more powerful spring yielding a 1.3 times higher torque, but also requiring a higher supply pressure (5.5 bar). The B1JK has a lighter spring yielding a 0.7 times lower torque and reducing the supply pressure requirement. See Section 10.

4.7.1 Maintenance

See Section 4.2.

4.8 B1JVA and B1JKA actuators

The actuators are otherwise like the B1JA, except the B1JVA has a more powerful spring yielding a higher torque, but also requiring a higher supply pressure. The B1JKA has a lighter spring yielding a lower torque and reducing the supply pressure requirement. See Section 10.

4.8.1 Maintenance

See Section 4.3.

4.9 B1J 322 and B1JA 322 actuators

In principle, the structure of the B1J 322 and B1JA 322 actuators is similar to that of the B1J or B1JA actuators, respectively. To obtain a high operating torque, these devices are, however, equipped with two cylinders connected via a linkage to the secondary shaft. See Section 10.

4.9.1 Maintenance

See Section 4.2 or 4.3 respectively.

4.10 B1J_H_ actuators

B1J_H_ actuators are provided with a manual hydraulic overdrive. The pneumatic cylinder is fitted with a manually operated hydraulic cylinder at the end of the piston rod. The correct mounting positions of the hydraulic pump unit are:

- ☐ horizontally (the lever arm on top) or
- ☐ vertically (the piston end pointing downwards)

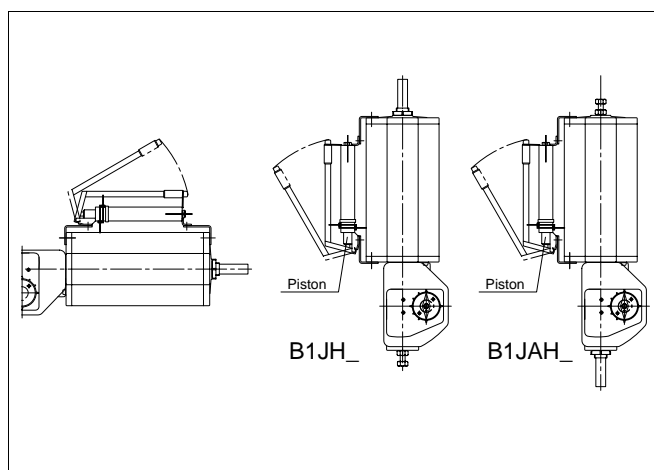


Fig. 30 B1J_H_ actuator, mounting positions

4.10.1 Maintenance

See Section 4.2 or 4.3 respectively.

5 MALFUNCTIONS

Table 2 lists malfunctions that might occur after prolonged use.

6 TOOLS

For maintenance of the actuator, you will need a few special tools in addition to the usual ones. The following can be ordered from the manufacturer:

- ☐ For actuator removal:
 - Extractor
- ☐ For piston seal installation:
 - Tie ring
- ☐ For cylinder base removal:
 - Lock nut key

Table 2 Possible malfunctions

Symptom	Possible cause	Action
Irregular or slow operation	Low supply pressure	Make sure that supply pressure complies with minimum torque required by valve. Check that supply air pipes are large enough.
	Positioner fault	Check positioner operation.
	Valve fault	Check that valve functions properly without actuator.
	Incorrect actuator rating	Contact manufacturer to check rating.
	Leak in piston or piston rod seal	Replace seals. See sect. 4.2.1 or 4.3.1, depending on actuator type.
	Cylinder damaged by impurities	Note installation position recommendation. Replace cylinder if damaged.
	Worn-out actuator bearings	Check bearings as in Sections 4.2.2 or 4.3.2, depending on actuator type. Replace bearings when necessary. If operating density is high, bearings and piston seals must be replaced regularly: max. 500,000 operations.
	Linkage corroded in harsh, humid conditions	Clean linkage and replace bearings. When necessary lubricate housing or fill with grease regularly as in Section 4.1. If water occurs in housing, an outlet hole (Ø 5 mm) can be bored in lower part of housing.
	Bearing unit fastening screw loose	Tighten screw. Seal e.g. with Loctite 225.
	Backlash in joint between actuator and valve	Replace parts as necessary.

7 ORDERING SPARE PARTS

NOTE:

Use only original spare parts. This ensures proper functioning of the actuator.

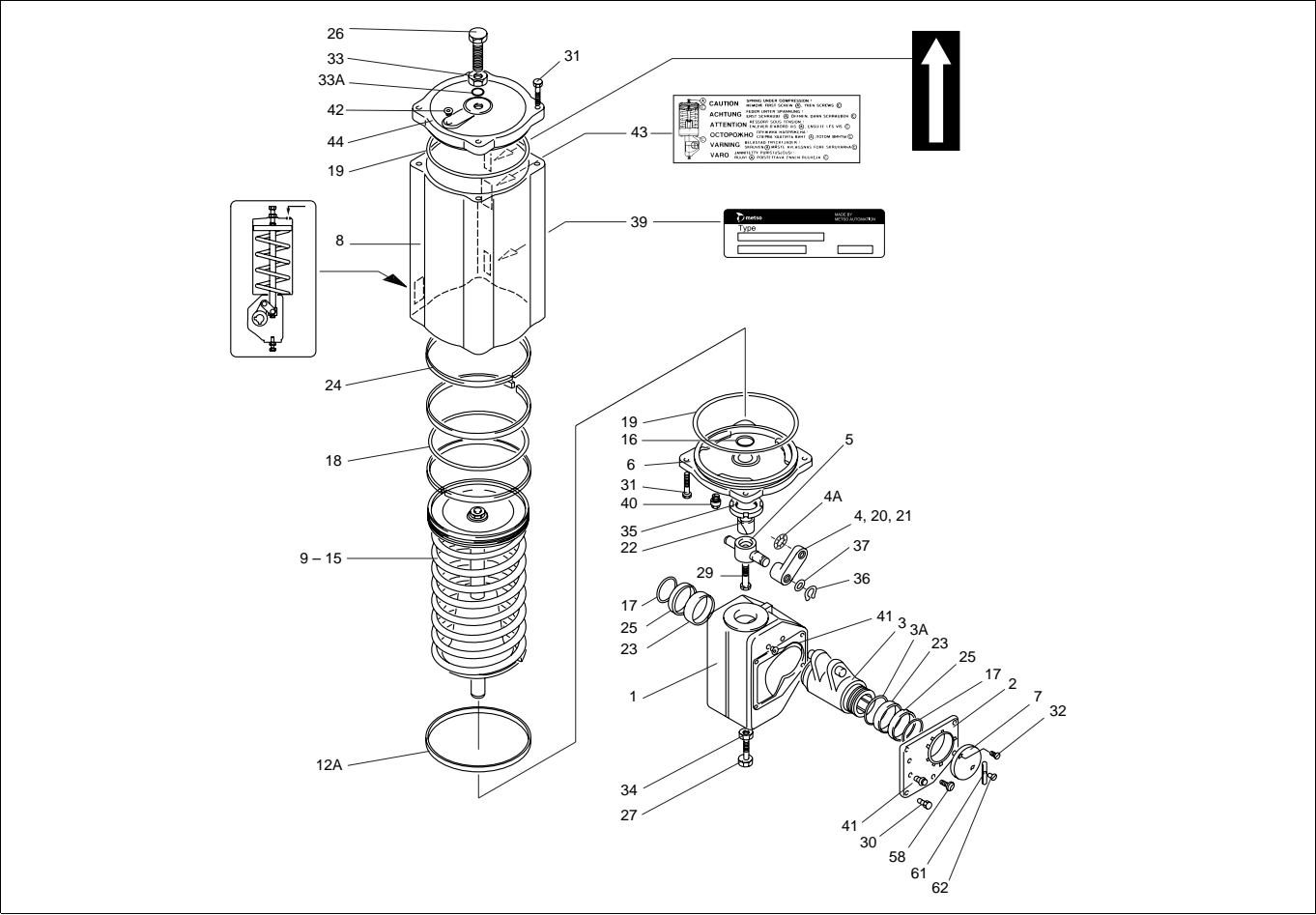
When ordering spare parts, always include the following information:

- ☐ type code, sales order number, serial number
- ☐ number of the parts list, part number, name of the part and quantity required

This information can be found from the identification plate or documents.

8 EXPLODED VIEWS AND PARTS LISTS

8.1 Actuators B1J 8-20

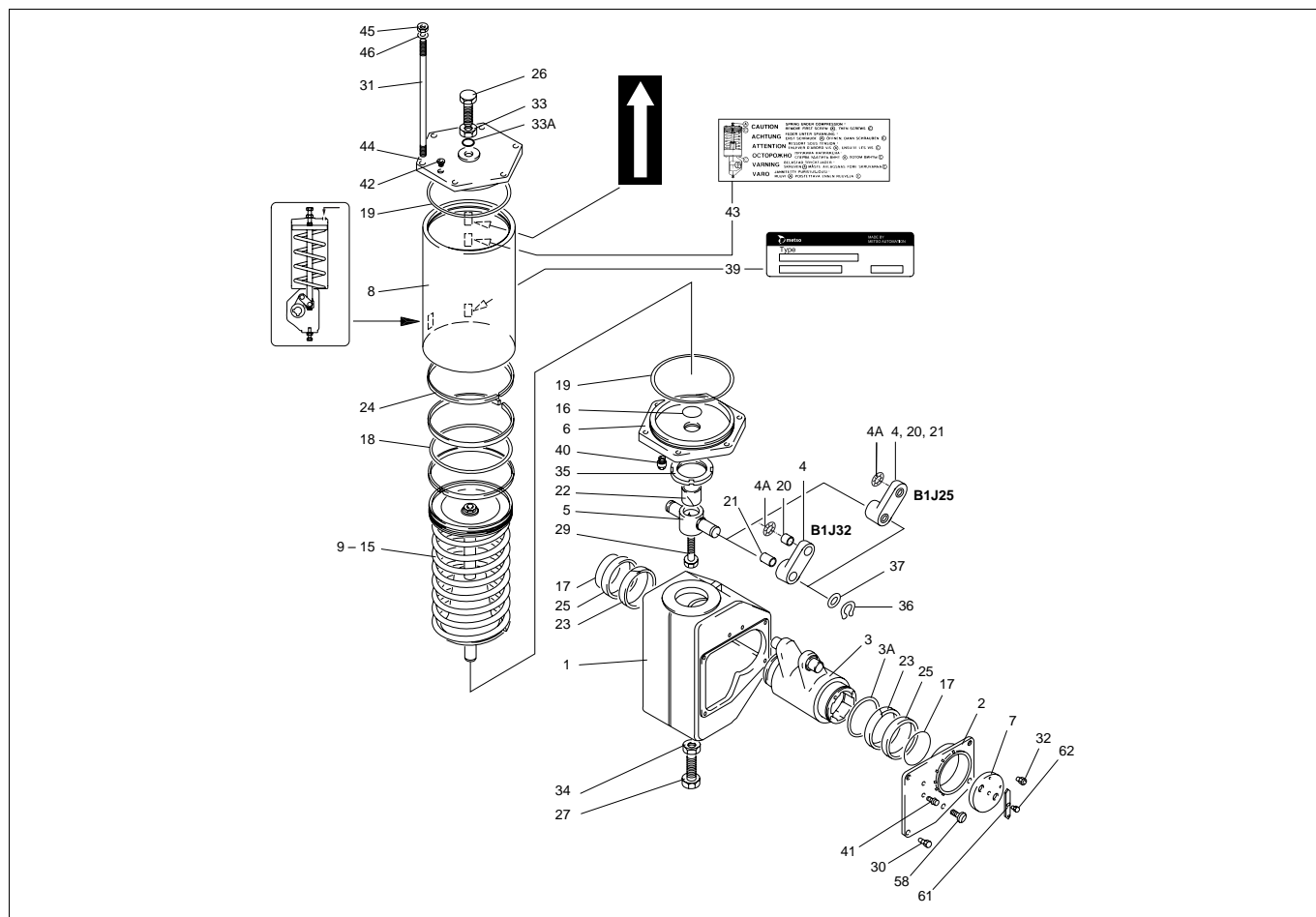


Item	Qty	Description	Spare part category	Item	Qty	Description	Spare part category
1	1	Housing		25	2	Bushing	3
2	1	Cover	3	26	1	Stop screw	3
3	1	Lever arm	2	27	1	Stop screw	3
3A	1	Antistatic ring	2	29	1	Screw	
4	2	Connection arm and bearings	2 **	30	4	Screw	
4A ****	1	Antistatic ring	2 **	31	8, 12	Screw	
5	1	Bearing unit	2 **	32	2	Screw	
6	1	Cylinder base	3	33	1	Nut	3
7	1	Pointer cover	3	33A	1	O-ring	3
8	1	Cylinder	3	34	1	Nut	3
9	1	Piston	***	35	1	Lock nut	3
10	1	Piston rod	***	36	2	Lock ring	
11	1	Spring	***	37	2	Support ring	
12	1	Spring plate	***	39	1	ID plate	
12A	1	Protection bushing	***	40	1	Filter	
13	1	Ring	***	41	4	Plug	
14	2	Lock ring	***	42	1	Plug	
15	1	Hexagon nut	***	43	1	Warning plate	
16	1	O-ring	1 *	44	1	Cylinder end	3
17	2	O-ring	1 *	58	1	Pressure outlet valve	
18	1	O-ring	1 *	61	1	Direction arrow	3
19	1	O-ring	1 *	62	1	Screw	
20	2	Bearing	2 **				
21	2	Bearing	2 **				
22	1	Bearing	1 *				
23	2	Bearing	1 *				
24	3	Piston seal	1 *				

*) Delivered as a set
**) Leverage assembly, also available as separate part.
Parts 20 and 21 are not available separately. They are delivered with part 4 as a set only
***) Part of spring assembly
****) With long-run option

Spare part category 1: Recommended soft parts for basic maintenance
Spare part category 2: Leverage repair
Spare part category 3: Complete overhaul (for complete overhaul parts of all 3 categories are needed)

8.2 Actuators B1J 25-32



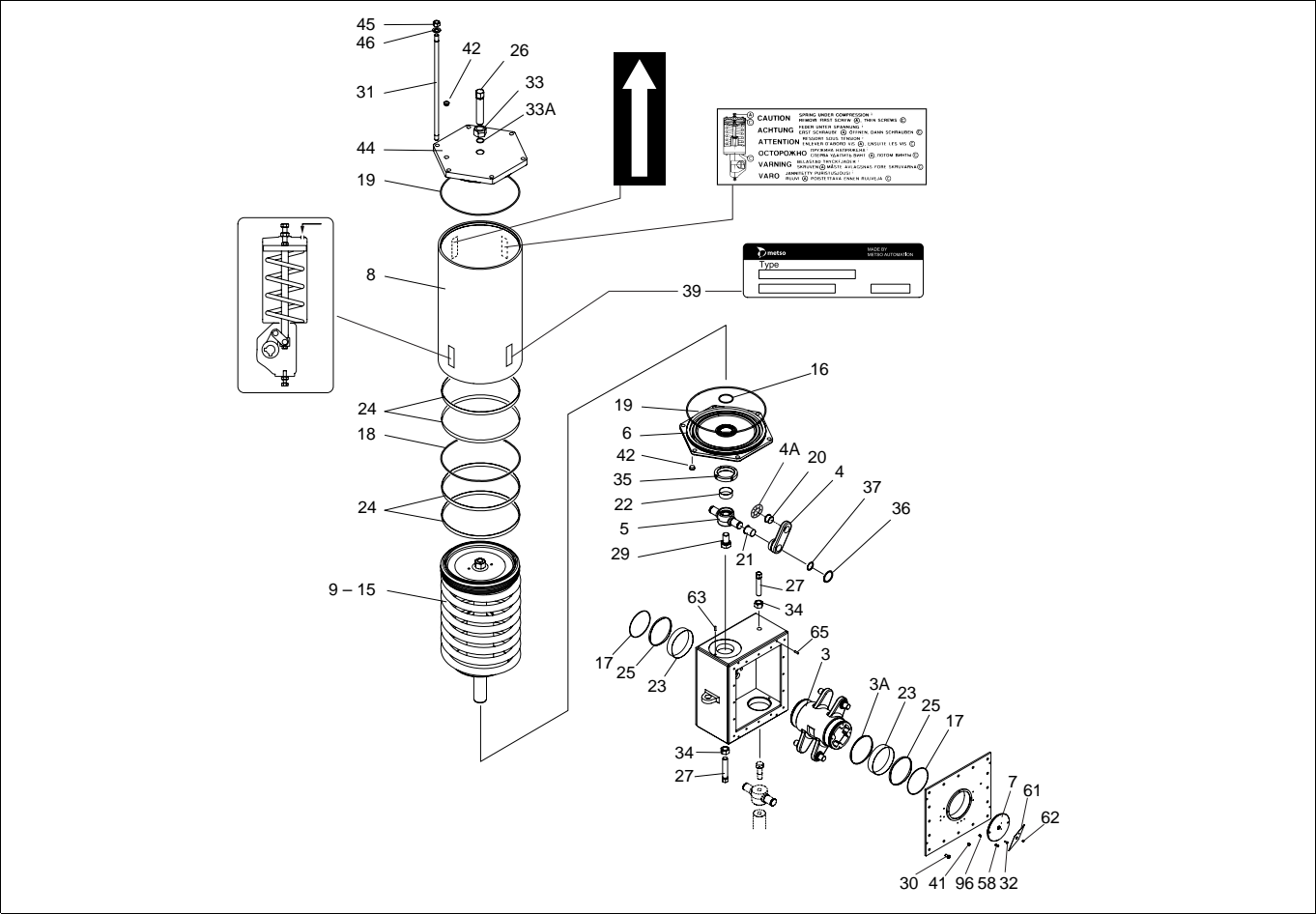
Item	Qty	Description	Spare part category	Item	Qty	Description	Spare part category
1	1	Housing		26	1	Stop screw	3
2	1	Cover	3	27	1	Stop screw	3
3	1	Lever arm	2 **	29	1	Screw	
3A	1	Antistatic ring	2 **	30	4	Screw	
4	2	Connection arm	2 **	31	6	Stud	
4A ****	1	Antistatic ring	2 **	32	2	Screw	
5	1	Bearing unit	2 **	33	1	Nut	3
6	1	Cylinder base	3	33A	1	O-ring	3
7	1	Pointer cover	3	34	1	Nut	3
8	1	Cylinder	3	35	1	Lock nut	3
9	1	Piston	***	36	2	Lock ring	
10	1	Piston rod	***	37	2	Support ring	
11	1	Spring	***	39	1	ID plate	
12	1	Spring plate	***	40	1	Filter	
13	1	Ring	***	41	4	Plug	
14	2	Lock ring	***	42	1	Plug	
15	1	Hexagon nut	***	43	1	Warning plate	
16	1	O-ring	1 *	44	1	Cylinder end	3
17	2	O-ring	1 *	45	6	Nut	
18	1	O-ring	1 *	46	6	Washer	
19	1	O-ring	1 *	58	1	Pressure outlet valve	
20	2	Bearing	2 ** (size 32: 1 *)	61	1	Direction arrow	3
21	2	Bearing	2 ** (size 32: 1 *)	62	1	Screw	
22	1, 2	Bearing	1 *	*) Delivered as a set **) Leverage assembly, also available as separate part. Actuator size25: Parts 20 and 21 are not available separately. They are delivered with part 4 as a set only. ***) Part of spring assembly ****) With long-run option and size 32			
23	2	Bearing	1 *				
24	3, 4	Piston seal	1 *				
25	2	Bushing	3				

Spare part category 1: Recommended soft parts for basic maintenance

Spare part category 2: Leverage repair

Spare part category 3: Complete overhaul (for complete overhaul parts of all 3 categories are needed)

8.3 Actuator B1JU322



Item	Qty	Description	Spare part category	Item	Qty	Description	Spare part category
1	1	Housing		27	2	Stop screw	3
2	1	Cover	3	29	2	Screw	
3	1	Lever arm	2 **	30	16	Screw	
3A	1	Antistatic ring	2 **	31	12	Screw	
4	4	Connection arm	2 **	32	2	Screw	
4A	1	Antistatic ring	2 **	33	2	Nut	3
5	2	Bearing unit	2 **	33A	2	O-ring	3
6	2	Cylinder base	3	34	2	Nut	3
7	1	Pointer cover	3	35	2	Lock nut	3
8	2	Cylinder	3	36	4	Lock ring	
9	2	Piston	***	37	4	Support ring	
10	2	Piston rod	***	39	1	ID plate	
11	2	Spring	***	40	2	Filter	
12	1	Spring plate	***	41	4	Plug	
13	2	Ring	***	42	2	Plug	
14	4	Retainer ring	***	43	2	Warning plate	
15	2	Hexagon nut	***	44	2	Cylinder end	3
16	2	O-ring	1 *	45	2	Hexagon nut	
17	2	O-ring	1 *	46	2	Washer	
18	2	O-ring	1 *	58	1	Pressure outlet valve	
19	4	O-ring	1 *	61	1	Direction arrow	3
20	4	Bearing	1 *	62	2	Screw	
21	4	Bearing	1 *	63	2	Pin	
22	2	Bearing	1 *	65	4	Pin	
23	2	Bearing	1 *	96	4	Screw	
24	8	Piston seal	1 *				
25	2	Bushing	3				
26	2	Stop screw	3				

*) Delivered as a set

**) Leverage assembly, also available as separate part

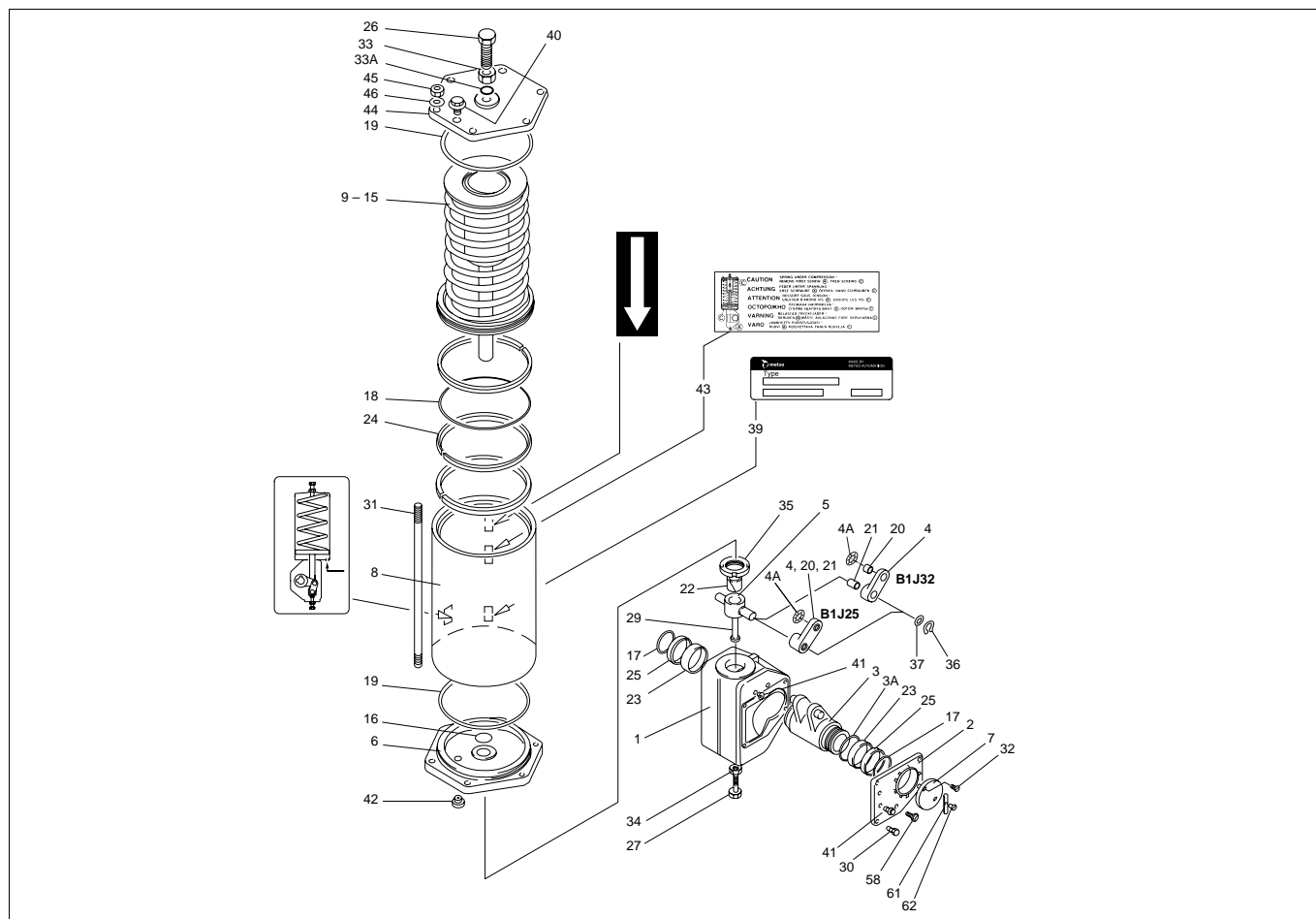
***) Part of spring assembly

Spare part category 1: Recommended soft parts for basic maintenance

Spare part category 2: Leverage repair

Spare part category 3: Complete overhaul (for complete overhaul parts of all 3 categories are needed)

8.5 Actuator B1JA 25-32



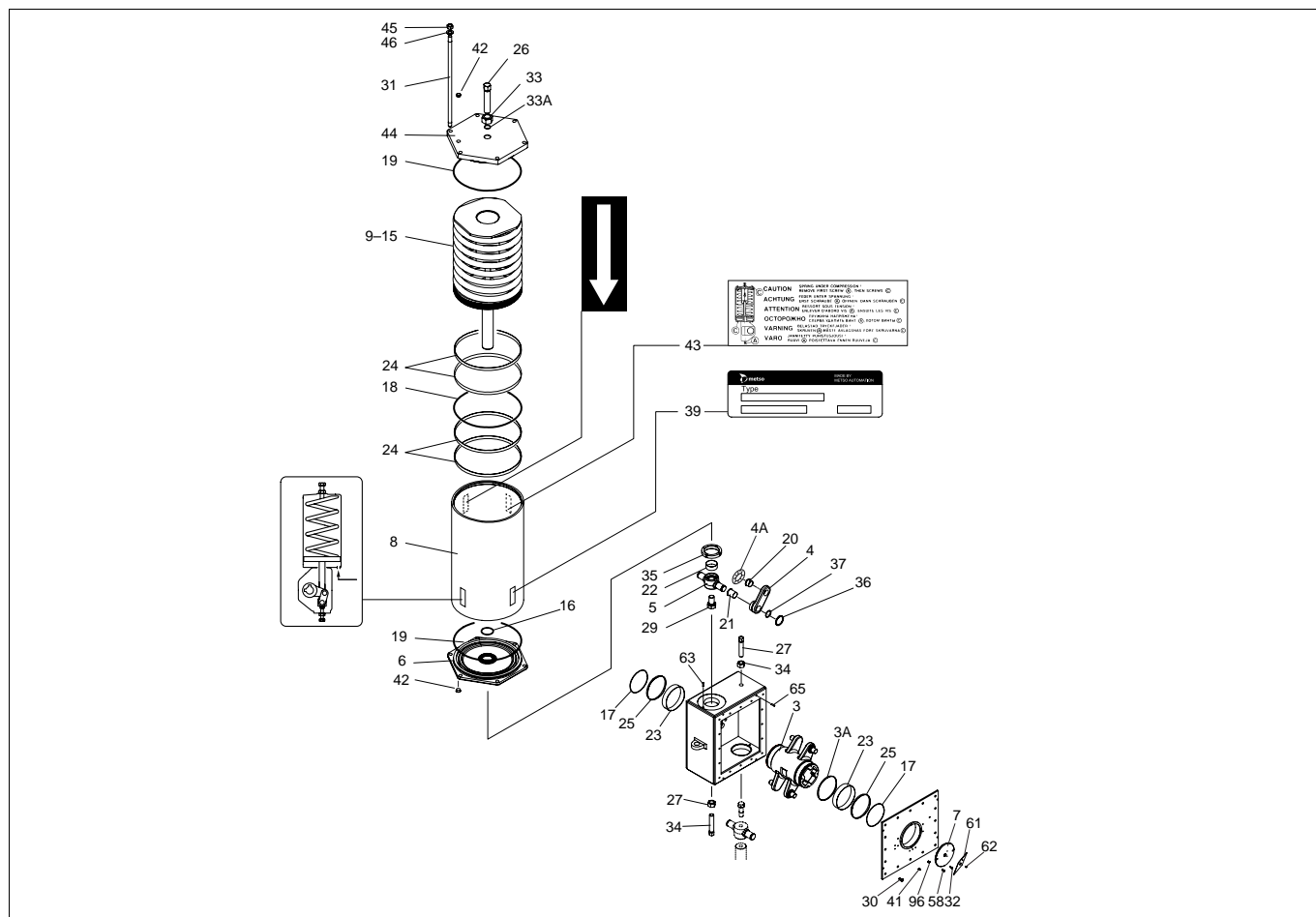
Item	Qty	Description	Spare part category	Item	Qty	Description	Spare part category
1	1	Housing		26	1	Stop screw	3
2	1	Cover	3	27	1	Stop screw	3
3	1	Lever arm	2 **	29	1	Screw	
3A	1	Antistatic ring	2 **	30	4	Screw	
4	2	Connection arm	2 **	31	6	Stud	
4A ****	1	Antistatic ring	2 **	32	2	Screw	
5	1	Bearing unit	2 **	33	1	Nut	3
6	1	Cylinder base	3	33A	1	O-ring	3
7	1	Pointer cover	3	34	1	Nut	3
8	1	Cylinder	3	35	1	Lock nut	3
9	1	Piston	***	36	2	Lock ring	
10	1	Piston rod	***	37	2	Support ring	
11	1	Spring	***	39	1	ID plate	
12	1	Spring plate	***	40	1	Filter	
13	1	Clamping tube	***	41	4	Plug	
15	1	Hexagon nut	***	42	1	Plug	
16	1	O-ring	1 *	43	1	Warning plate	
17	2	O-ring	1 *	44	1	Cylinder end	3
18	1	O-ring	1 *	45	6	Nut	
19	1	O-ring	1 *	46	6	Washer	
20	2	Bearing	2 ** size 32: 1 *	58	1	Pressure outlet valve	
21	2	Bearing	2 ** size 32: 1 *	61	1	Direction arrow	3
22	1, 2	Bearing	1 *	62	1	Screw	
23	2	Bearing	1 *	*) Delivered as a set			
24	3, 4	Piston seal	1 *	**) Leverage assembly, also available as separate part.			
25	2	Bushing	3	Actuator size 25: Parts 20 and 21 are not available separately.			
				They are delivered with part 4 as a set only.			
				***) Part of spring assembly			
				****) With long-run option and size 32			

Spare part category 1: Recommended soft parts for basic maintenance

Spare part category 2: Leverage repair

Spare part category 3: Complete overhaul (for complete overhaul parts of all 3 categories are needed)

8.6 Actuator B1JAU 322



Item	Qty	Description	Spare part category	Item	Qty	Description	Spare part category
1	1	Housing		27	2	Stop screw	3
2	1	Cover	3	29	2	Screw	
3	1	Lever arm	2 **	30	16	Screw	
3A	1	Antistatic ring	2 **	31	12	Stud	
4	4	Connection arm	2 **	32	2	Screw	
4A	1	Antistatic ring	2 **	33	2	Nut	3
5	2	Bearing unit	2 **	33A	2	O-ring	3
6	2	Cylinder base	3	34	2	Nut	3
7	1	Pointer cover	3	35	2	Lock nut	3
8	2	Cylinder	3	36	4	Lock ring	
9	2	Piston	***	37	4	Support ring	
10	2	Piston rod	***	39	1	ID plate	
11	2	Spring	***	40	2	Filter	
12	1	Spring plate	***	41	4	Plug	
13	2	Ring	***	42	2	Plug	
15	2	Hexagon nut	***	43	2	Warning plate	
16	2	O-ring	1 *	44	2	Cylinder end	3
17	2	O-ring	1 *	45	2	Hexagon nut	
18	2	O-ring	1 *	46	2	Washer	
19	4	O-ring	1 *	58	1	Pressure outlet valve	
20	4	Bearing	1 *	61	1	Direction arrow	3
21	4	Bearing	1 *	62	2	Screw	
22	2	Bearing	1 *	63	2	Pin	
23	2	Bearing	1 *	65	4	Pin	
24	8	Piston seal	1 *	96	4	Screw	
25	2	Bushing	3				
26	2	Stop screw	3				

*) Delivered as a set

**) Leverage assembly, also available as separate part

***) Part of spring assembly

Spare part category 1: Recommended soft parts for basic maintenance

Spare part category 2: Leverage repair

Spare part category 3: Complete overhaul (for complete overhaul parts of all 3 categories are needed)

9 DIMENSIONS AND WEIGHTS

9.1 Actuators B1J, B1JA

B1J322
Weight: 1650 kg / 3630 lb

Type	Dimensions, mm											NPT	kg
	X	G	F	V	Y	L	K*	K1	R*	R1*			
B1J, B1JA8	135	420	555	43	50	80	130	140	72	81	3/8	17	
B1J, B1JA10	175	480	640	51	50	95	144	154	80	89	3/8	30	
B1J, B1JA12	215	620	815	65	65	120	175	190	94	109	1/2	57	
B1J, B1JA16	265	760	990	78	70	137	207	222	111	126	1/2	100	
B1J, B1JA20	395	940	1230	97	80	145	240	262	125	147	3/4	175	
B1J, B1JA25	505	1140	1490	121	110	180	300	304	162	166	3/4	350	
B1J, B1JA32	540	1435	1885	153	146	280	376	379	201	204	1	671	

Type	Dimensions, in											NPT	lb
	X	G	F	V	Y	L	K*	K1	R*	R1*			
B1J, B1JA8	5.31	16.50	21.90	1.69	1.97	3.15	5.12	5.51	2.83	3.19	3/8	37	
B1J, B1JA10	6.89	18.90	25.20	2.01	1.97	3.74	5.67	6.06	3.15	3.50	3/8	66	
B1J, B1JA12	8.46	24.40	32.10	2.56	2.56	4.72	6.89	7.48	3.70	4.29	1/2	126	
B1J, B1JA16	10.43	29.90	38.00	3.07	2.76	5.39	8.15	8.74	4.37	4.96	1/2	220	
B1J, B1JA20	15.55	37.00	48.40	3.82	3.15	5.71	9.45	10.31	4.92	5.79	3/4	386	
B1J, B1JA25	19.88	44.90	58.70	4.76	4.33	7.09	11.81	11.97	6.38	6.54	3/4	771	
B1J, B1JA32	21.26	56.50	74.20	6.02	5.75	11.0	14.80	14.92	7.91	8.03	1	1479	

*) Dimensions K and R are for Metso accessories interface.
Dimensions K1 and R1 are for VDI/VDE 3845 interface (type code "U").

9.2 Actuator B1JR / B1JRR

B1JR8
Weight: 19 kg

Type	Dimensions, mm														kg
	X	Z	G	F	H	I	J	V	Y	L	K*	K1	R*	R1	
B1JR8	135	250	570	705	—	—	—	43	50	80	130	140	72	81	19
B1JR10	175	250	695	855	—	—	—	51	50	95	144	154	80	89	33
B1JR12	215	250	805	1000	—	—	—	65	65	120	175	190	94	109	60
B1JR16	265	400	1080	1310	—	—	—	78	70	137	207	222	111	126	106
B1JRR20	395	200	1455	1745	868	48.25	230	97	80	145	240	262	125	147	210
B1JRR25	505	250	1665	2015	1074	48.25	280	121	110	180	300	304	162	166	380
B1JRR32	540	400	1895	2345	1306	48.25	375	153	146	280	376	379	201	204	705

Type	Dimensions, in														lb
	X	Z	G	F	H	I	J	V	Y	L	K*	K1	R*	R1	
B1JR8	5.3	9.8	22.4	27.8	—	—	—	1.7	2.0	3.1	5.1	5.5	2.8	3.2	42
B1JR10	6.9	9.8	27.4	33.7	—	—	—	2.0	2.0	3.7	5.7	6.1	3.1	3.5	73
B1JR12	8.5	9.8	31.7	39.4	—	—	—	2.6	2.6	4.7	6.9	7.5	3.7	4.3	132
B1JR16	10.4	15.7	42.5	51.6	—	—	—	3.1	2.8	5.4	8.1	8.7	4.4	5.0	233
B1JRR20	15.6	7.9	57.3	68.7	34.2	1.9	9.1	3.8	3.1	5.7	9.4	10.3	4.9	5.8	463
B1JRR25	19.9	9.8	65.6	79.3	42.3	1.9	11.0	4.8	4.3	7.1	11.8	12.0	6.4	6.5	837
B1JRR32	21.3	15.7	74.6	92.3	51.4	1.9	14.8	6.0	5.75	11.0	14.8	14.9	7.9	8.0	1553

*) Dimensions K and R are for Metso accessories interface.
Dimensions K1 and R1 are for VDI/VDE 3845 interface (type code "U").

10 TYPE CODE

Pneumatic spring-return cylinder actuator, B1J

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
B1	J	K	A	R	S	W	U	20/70	H	E	Z

1.	Product group
B1	Cylinder actuator with attachment dimensions acc. ISO 5211
2.	Series
J	Pneumatic, spring-return
3.	Spring option
-	Standard construction without sign
K	Light spring
V	Strong spring
4.	Function code
-	Spring-to-close operation without sign
A	Spring-to-open operation
5.	Construction
-	Standard construction without sign
R	Secondary handwheel for manual operation (sizes 8-16)
RR	Secondary handwheel with wormgear (sizes 20 - 32)
H	Manual hydraulic override
6.	Cylinder and housing materials
-	Aluminium cylinder and GG-20 housing, standard without sign
S	Steel cylinder and GG-20 housing
B	Aluminium cylinder and GGG-40 housing
X	Steel cylinder and GGG-40 housing
7.	Special construction
-	Standard construction without sign
Q	Mechanical locking device for piston movement limit on housing end. Locking with long screw to close position
W	Mechanical locking device for piston movement limit on cylinder end. Locking with long screw to open position
QW	Mechanical locking device for piston movement limit on housing and cylinder ends. Locking with long screws to close as well as to open position
PP	Actuator equipped with automatic latching device for open position in series B1J and for closed position in series B1JA allowing about 20 degrees' motion.
T	Actuator equipped with manual latching device. The actuator can be locked in series B1J for open position and in series B1JA for closed position allowing about 20 degrees' motion.
Z	Actuator equipped with shock absorber on cylinder end
N	Actuator equipped with shock absorber on housing end
Y	Special construction

8.	INTERFACE FOR ADDITIONAL DEVICES
U	Interface according to VDI / VDE 3845, standard construction.
9.	Actuator size
	E.g. 20/70 = actuator size / shaft bore diameter
10.	Materials of seals and bearings
-	Standard construction without sign (-20° to +70 °C) O-rings: Nitrile rubber Bearings and piston seals: PE-HDD DU-bearings in sizes 8 to 25 Stainless steel net + PTFE bearings with antistatic ring in sizes 32 to 322
H	High temperatures (-20° to +120 °C). Dynamic O-rings: Fluorocarbon rubber Bearings and piston seals: PTFE + C25
C	Low temperatures (-40° to +70 °C). Dynamic O-rings: Epichlorhydrin rubber Bearings and piston seals: PTFE + C25
F	Oversized NPT connections: fast operation
F1	Large oversized NPT connections: faster operation
F2	Largest oversized NPT connections: fastest operation
L	High cycle High cycle bearings: Fiberglide with antistatic ring Special piston rod seal: Double Delta; O-ring + PTFE
D	DU-bearings For sizes 32 to 322
11.	Screw material
-	Stainless steel (standard) without sign for sizes 8–20 Steel, zinc coated and passivated (standard) without sign for sizes 25 and bigger.
E	Stainless steel for sizes 25 and bigger
12.	Non-standard operation range
X	Valve closed position is limited to a given angle. E.g. X=30 (never fully closed).)
Z	Valve open position is limited to a given angle. E.g. Z=70 (never fully open).
XZ	Valve closed and open position are limited. X = 30 (closed position is limited to 30°) Z = 70 (open position is limited to 70°)

Metso Automation Inc.

Europe, Levytie 6, P.O. Box 310, 00811 Helsinki, Finland. Tel. +358 20 483 150. Fax +358 20 483 151

North America, 44 Bowditch Drive, P.O. Box 8044, Shrewsbury, MA 01545, USA. Tel. +1 508 852 0200. Fax +1 508 852 8172

Latin America, Av. Independência, 2500-Iporanga, 18087-101, Sorocaba-São Paulo, Brazil. Tel. +55 15 3235 9700. Fax +55 15 3235 9748/49

Asia Pacific, 238A Thomson Road, #25-09 Novena Square Tower A, 307684 Singapore. Tel. +65 6511 1011. Fax +65 6250 0830

China, 19/F, the Exchange Beijing, No. 118, Jianguo Lu Yi, Chaoyang Dist, 100022 Beijing, China. Tel. +86-10-6566-6600. Fax +86-10-6566-2575

Middle East, Roundabout 8, Unit AB-07, P.O. Box 17175, Jebel Ali Freezone, Dubai, United Arab Emirates.

Tel. +971 4 883 6974. Fax +971 4 883 6836

www.metso.com/automation

